Yee & Associates, P.C.

4100 Alpha Road
Suite 1100
Dallas, Texas 75244

Main No. (972) 385-8777
Facsimile (972) 385-7766

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To: Commissioner for Patents for **Examiner Angel A. Castro** **Group Art Unit 2653**	Facsimile No.: **703/872-9306**
From: Amelia Turner Legal Assistant to Stephen R. Tkacs	No. of Pages Including Cover Sheet: **19**
Message: Transmitted herewith: • Transmittal Document; and • Appeal Brief.	
Re: Application No.: **09/896,162** Attorney Docket No: **2001-020-TAP**	
Date: Monday, June 06, 2005	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Dee**	§	Group Art Unit: **2653**
	§	
Serial No.: **09/896,162**	§	Examiner: **Castro, Angel A.**
	§	
Filed: **June 29, 2001**	§	Attorney Docket No.: **2001-020-TAP**
For: **Apparatus and Method of Making a Reduced Sensitivity Spin Valve Sensor Apparatus in Which a Flux Carrying Capacity is Increased**	§	<u>Certificate of Transmission Under 37 C.F.R. § 1.8(a)</u> I hereby certify this correspondence is being transmitted via facsimile to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, facsimile number (703) 872-9306, on June 6, 2005. By: *Amelia C. Turner* Amelia C. Turner

TRANSMITTAL DOCUMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:
TRANSMITTED HEREWITH:

- Appeal Brief (37 C.F.R. 41.37).

A fee of $500.00 is required for filing an Appeal Brief. Please charge this fee to Storage Technology Corporation Deposit Account No. 19-4545. No additional fees are believed to be necessary. If, however, any additional fees are required, I authorize the Commissioner to charge these fees which may be required to Storage Technology Corporation Deposit Account No. 19-4545. No extension of time is believed to be necessary. If, however, an extension of time is required, the extension is requested, and I authorize the Commissioner to charge any fees for this extension to Storage Technology Corporation Deposit Account No. 19-4545.

Respectfully submitted,

Stephen R. Tkacs
Registration No. 46,430
AGENT FOR APPLICANT
Duke W. Yee
Registration No. 34,285
YEE & ASSOCIATES, P.C.
P.O. Box 802333
Dallas, Texas 75380
(972) 385-8777
ATTORNEY FOR APPLICANT

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Docket No. 2001-020-TAP

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Dee**

Serial No.: **09/896,162**

Filed: **June 29, 2001**

For: **Apparatus and Method of Making a Reduced Sensitivity Spin Valve Sensor Apparatus in Which a Flux Carrying Capacity is Increased**

Group Art Unit: **2653**

Examiner: **Castro, Angel A.**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certificate of Transmission Under 37 C.F.R. § 1.8(a)
I hereby certify this correspondence is being transmitted via facsimile to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, facsimile number (703) 872-9306, on June 6, 2005.

By: Amelia C. Turner
Amelia C. Turner

APPEAL BRIEF (37 C.F.R. 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on April 4, 2005.

The fees required under § 41.20(B)(2), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

06/07/2005 NNGUYEN1 00000050 194545 09896162

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REAL PARTY IN INTEREST

The real party in interest in this appeal is the following party: Storage Technology Corporation.

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RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

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STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 5-7, 9, 10, 15-17, and 19-21

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: 1-4, 8, 11-14, and 18
2. Claims withdrawn from consideration but not canceled: NONE
3. Claims pending: 5-7, 9, 10, 15-17, and 19-21
4. Claims allowed: NONE
5. Claims rejected: 5-7, 9, 10, 15-17, and 19-21
6. Claims objected to: NONE

C. CLAIMS ON APPEAL

The claims on appeal are: 5-7, 9, 10, 15-17, and 19-21

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STATUS OF AMENDMENTS

There are no amendments after final rejection.

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SUMMARY OF CLAIMED SUBJECT MATTER

Independent claims 5 and 15:

The present invention provides a spin valve sensor with reduced magnetic sensitivity and a method of making such a reduced sensitivity spin valve sensor. The magnetic sensitivity is reduced by stiffening the free layer(s). See specification, page 16, lines 6-18, for example. The sensitivity is also reduced by increasing the flux carrying capacity of the spin valve sensor. See specification, page 20, lines 8-13. At least two outer layers have fixed magnetization directions. See **1010, 1040** in **Figure 10B**; page 22, lines 16-18. The spin valve sensor also includes at least two inner layers whose magnetization directions are free to rotate based on an applied magnetic field. See **1020, 1030** in **Figure 10B**; page 22, lines 18-21. The inner layers are positioned between the outer layers. The at least two outer layers have a parallel magnetic orientation. See magnetic direction of **1010, 1040** shown in **Figure 10B.**

Independent claim 21:

The present invention provides a spin valve sensor with reduced magnetic sensitivity. The magnetic sensitivity is reduced by stiffening the free layer(s). See specification, page 16, lines 6-18, for example. The outer layers, first and fourth ferromagnetic material layers, have parallel fixed magnetization directions. See **1010, 1040** in **Figure 10B**; page 22, lines 16-18. The spin valve sensor also comprises two inner layers, second and third ferromagnetic material layers, that have magnetization directions that can rotate when under applied magnetic fields. See **1020, 1030** in **Figure 10B**; page 22, lines 18-21. The ferromagnetic material layers are separated respectively from one another by three non-magnetic spacer layers. See **1050-1070** in **Figure 10B**; page 22, lines 11-16. Magnetic flux is spread across at least the second and third ferromagnetic material layers to thereby reduce the magnetic flux fed to the second and third ferromagnetic layers. See specification, page 20, lines 8-13.

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GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection are as follows:

I. Claims 5-7, 9-10, 15-17, 19-21 are rejected under 35 U.S.C. § 102 as being anticipated by *Gill* (U.S. Patent No. 5,751,521).

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ARGUMENT

I. 35 U.S.C. § 102, Alleged Anticipation of Claims 5-7, 9, 10, 15-17, and 19-21

The Final Office Action rejects claims 5-7, 9, 10, 15-17, 19-21 under 35 U.S.C. § 102 as being allegedly anticipated by *Gill* (U.S. Patent No. 5,751,521). This rejection is respectfully traversed.

IA. Alleged Anticipation of Claims 5-7, 9, 10, 15-17, 19, and 20

The Final Office Action states:

> Regarding claims 5 and 15, Gill discloses a reduced sensitivity spin valve sensor (figure 6), comprising:
> at least two magnetically fixed layers 162, 156; and
> at least two free layers 158, 164;
> wherein the at least two free layers are positioned between the at least two fixed layers; and
> wherein the at least two magnetically fixed layers have a parallel magnetic orientation (see orientation 168, 172).

Final Office Action, dated December 23, 2004. Appellant respectfully disagrees. *Gill* teaches a read head with two spin valve sensors **130** and **132**. Each spin valve sensor has one magnetically fixed (pinned) layer and two free layers. For example, spin valve sensor **130** includes pinned layer **156** and free layers **176** and **178**. Spin valve sensor **132** includes pinned layer **162** and free layers **182** and **184**. Insulation layer **134** separates the two spin valve sensors. *Gill* states:

> Accordingly, when the spin valve read head **52** is subjected to a magnetic field of one polarity, the spin valve sensor **130** will produce a response signal of one polarity and the spin valve sensor **132** will produce a second signal of opposite polarity. The response signals are 180° out of phase with respect to one another and are differentially detected by the differential amplifier **144** which combines the response signals to produce an enhanced response signal free of the noise picked up by the sensors due to common mode noise rejection. The laminated free layers **158** and **164** are described in a commonly assigned U. S. Pat. No. 5,408,377. With the present invention the antiferromagnetic layers **166** and **170** can be constructed of the same material and simultaneously set in their magnetic orientations during fabrication.

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Gill, col. 8, lines 31-45. Thus, *Gill* teaches that the two spin valve sensors are separated by an insulation layer so that the spin valve sensors produce **independent** response signals that are 180° out of phase.

In contradistinction, the present invention provides a spin valve sensor that includes two magnetically fixed layers. *Gill* does not teach a single spin valve sensor that includes two magnetically fixed layers, as recited in claim 5.

The Final Office Action states:

> The Examiner respectfully points out that claims 5, 15 and 21, does not claim a single spin valve sensor but "a spin valve sensor" and that figure 10B shows two spin valve sensors separated by a non-magnetic layer 1060.

Claim 5 does indeed recite "[a] reduced sensitivity spin valve sensor." Similarly, claim 15 recites "a reduced sensitivity spin valve sensor." However, the Examiner incorrectly interprets "a spin valve sensor" to be plural. The noun phrases in the preamble of claims 5 and 15 are deliberately and undeniably singular. The Examiner also asserts that the spin valve sensor shown in **Figure 10B** of the instant application is allegedly two spin valve sensors simply because the two free layers are separated by a non-magnetic layer. Appellant respectfully disagrees for the reasons presented below.

The mere presence of a non-magnetic layer does not indicate that there are actually two spin valve sensors. If that were the case, then **Figure 10B** would actually show four spin valve sensors, one layer each, because each pair of adjacent ferromagnetic layers in the example shown in **Figure 10B** is separated by a non-magnetic layer. Similarly, using the logic presented in the Final Office Action, *Gill* actually teaches six spin valve sensors, because of non-magnetic layers **154, 174, 134, 180,** and **160**. Clearly, this is not the case. Not all non-magnetic layers serve to separate distinct spin valve sensors. For example, non-magnetic layer **174** in *Gill* simply separates free layers that are part of the same spin valve sensor. Similarly, non-magnetic layer **160** in **Figure 10B** of the instant application also separates free layers of the same spin valve sensor.

On the other hand, as clearly shown and described in *Gill*, the purpose of insulation layer **134** is to separate spin valve sensor **130** and spin valve sensor **132** so that they operate independently. Actually, in *Gill*, insulation layer **134** separates spin valve sensor **130** from spin

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valve sensor **132** by enough spacing to allow the two spin valve sensors to produce separate signals, which must then be **combined** with differential amplifier **144**. Such is not the case with non-magnetic layer **160** in the example depicted in the instant application. In fact, the instant application clearly states that magnetic flux is spread across the two free layers to reduce magnetic flux. The instant application clearly describes a configuration that operates as a single spin valve sensor with reduced magnetic sensitivity, while *Gill* clearly describes two spin valve sensors operating independently. The entire rejection fails with this rudimentary distinction.

The applied reference does not teach or fairly suggest each and every claim limitation, especially as comprising a reduced sensitivity spin valve sensor; therefore, *Gill* does not anticipate claim 5. Independent claim 15 recites subject matter addressed above with respect to claim 5 and is allowable for the same reasons. Since claims 6, 7, 9, 10, 16, 17, 19, and 20 depend from claims 5 and 15, the same distinctions between *Gill* and the invention recited in claims 5 and 15 apply for these claims. Additionally, claims 6, 7, 9, 10, 16, 17, 19, and 20 recite other additional combinations of features not suggested by the reference.

Therefore, Appellant respectfully requests that the rejection of claims 5-7, 9-10, 15-17, 19, and 20 under 35 U.S.C. § 102 not be sustained.

IA1. Alleged Anticipation of claims 10 and 20

The Office Action states:

> Regarding claims 10 and 20, it is evident from the reference to Gill that the magnetic flux is distributed across the at least two free layers to thereby reduce a magnetic flux fed to each free layer (see Figure 6).

Office Action, dated June 9, 2004. Appellant respectfully disagrees. *Gill* teaches two separate spin valve sensors that include two free layers. Each spin valve sensor includes free layers that are antiparallel in magnetic orientation. The purpose of this is only for determining a differential signal based on the two separate spin valve sensors. As stated above, the response signals of the two spin valve sensors will be 180° out of phase. Thus, the differential produces an enhanced response signal, rather than a reduced response signal, as in the claimed invention. In fact, in *Gill*, insulation layer **134** separates spin valve sensor **130** from spin valve sensor **132** by enough spacing to allow the two spin valve sensors to produce separate signals, which must then be combined with differential amplifier **144**. Thus, *Gill* does not teach or fairly suggest that the

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magnetic flux is distributed across the at least two free layers to reduce a magnetic flux fed to each layer, as recited in claims 10 and 20.

Therefore, Applicant respectfully requests that the rejection of claims 10 and 20 under 35 U.S.C. § 102 not be sustained.

IB. Alleged Anticipation of Claim 21

The Final Office Action states:

> Regarding claim 21, Gill further discloses:
>
> First 156, second 158, third 164, and fourth 162 ferromagnetic material layers being separated respectively from one another by three non-magnetic spacer layers 154, 134, 160, the first and fourth ferromagnetic material layers being outermost ferromagnetic material layers with respect to the second and third ferromagnetic material layers;
>
> wherein the first and fourth ferromagnetic material layers have parallel fixed magnetization direction 168, 172;
>
> wherein the second and third ferromagnetic material layers have magnetization directions that can rotate when under applied magnetic fields;
>
> wherein magnetic flux is spread across at least the second and third ferromagnetic material layers to thereby reduce the magnetic flux fed to the second and third ferromagnetic layers.

Final Office Action, dated December 23, 2004. Appellant respectfully disagrees. As stated above, *Gill* teaches a read head with two independent spin valve sensors **130** and **132**. Each spin valve sensor has one magnetically fixed (pinned) layer and two free layers. In contradistinction, the present invention provides a spin valve sensor that includes two magnetically fixed layers. *Gill* does not teach a single spin valve sensor that includes two magnetically fixed layers, as recited in claim 21. The instant application clearly describes a configuration that operates as a single spin valve sensor with reduced magnetic sensitivity, while *Gill* clearly describes two spin valve sensors operating independently. The entire rejection fails with this rudimentary distinction.

Furthermore, *Gill* teaches two separate spin valve sensors and each includes two free layers. Each spin valve sensor includes free layers that are antiparallel in magnetic orientation. The purpose of this is only for determining a differential signal based on the two separate spin valve sensors. As stated above, the response signals of the two spin valve sensors will be 180° out of phase. Thus, the differential produces an enhanced response signal, rather than a reduced

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response signal, as in the claimed invention. In fact, in *Gill*, insulation layer **134** separates spin valve sensor **130** from spin valve sensor **132** by enough spacing to allow the two spin valve sensors to produce separate signals, which must then be combined with differential amplifier **144**. Therefore, *Gill* does not teach or fairly suggest that the magnetic flux is distributed across the at least two free layers to reduce a magnetic flux fed to each layer, as recited in claim 21.

II. <u>Conclusion</u>

In view of the above, Appellant respectfully submits that claims 5-7, 9, 10, 15-17, and 19-21 are allowable over the cited prior art and that the application is in condition for allowance. Accordingly, Appellant respectfully requests the Board of Patent Appeals and Interferences to not sustain the rejections set forth in the Final Office Action.

Respectfully submitted,

Stephen R. Tkacs
Registration No. 46,430
YEE & ASSOCIATES, P.C.
PO Box 802333
Dallas, TX 75380
(972) 385-8777

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CLAIMS APPENDIX

The text of the claims involved in the appeal reads:

5. A reduced sensitivity spin valve sensor, comprising:

at least two magnetically fixed layers; and

at least two free layers;

wherein the at least two free layers are positioned between the at least two fixed layers; and

wherein the at least two magnetically fixed layers have a parallel magnetic orientation.

6. The reduced sensitivity spin valve sensor of claim 5, further comprising at least one non-magnetic spacer positioned between one of the at least two fixed layers and one of the at least two free layers.

7. The reduced sensitivity spin valve sensor of claim 5, wherein the at least two fixed layers have a magnetic orientation approximately 90 degrees from a magnetic orientation of the at least two free layers.

9. The reduced sensitivity spin valve sensor of claim 5 wherein the at least two fixed layers and the at least two free layers are spaced from one another by three non-magnetic spacers.

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10. The reduced sensitivity spin valve sensor of claim 5, wherein a magnetic flux is distributed across the two free layers to thereby reduce a magnetic flux fed to each free layer.

15. A method of making a reduced sensitivity spin valve sensor, comprising:

providing at least two magnetically fixed layers; and

providing at least two free layers

wherein providing the at least two fixed layers includes positioning the at least two free layers between the at least two fixed layers; and

wherein the at least two fixed layers have a parallel magnetic orientation.

16. The method of making a reduced sensitivity spin valve sensor of claim 15, further comprising providing at least one non-magnetic spacer positioned between one of the at least two fixed layers and one of the at least two free layers.

17. The method of making a reduced sensitivity spin valve sensor of claim 15, wherein providing the at least two fixed layers includes providing at least two fixed layers having a magnetic orientation approximately 90 degrees from a magnetic orientation of the at least two free layers.

19. The method of making a reduced sensitivity spin valve sensor of claim 15, wherein providing the at least two fixed layers and providing the at least two free layers includes spacing the at least two fixed layers and at least two free layers from one another by three non-magnetic spacers.

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20. The method of making a reduced sensitivity spin valve sensor of claim 15, wherein a magnetic flux is distributed across the two free layers to thereby reduce a magnetic flux fed to each free layer.

21. A reduced sensitivity spin valve sensor, comprising:

first, second, third, and fourth ferromagnetic material layers being separated respectively from one another by three non-magnetic spacer layers, the first and fourth ferromagnetic material layers being outermost ferromagnetic material layers with respect to the second and third ferromagnetic material layers;

wherein the first and fourth ferromagnetic material layers have parallel fixed magnetization direction;

wherein the second and third ferromagnetic material layers have magnetization directions that can rotate when under applied magnetic fields;

wherein magnetic flux is spread across at least the second and third ferromagnetic material layers to thereby reduce the magnetic flux fed to the second and third ferromagnetic layers.

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EVIDENCE APPENDIX

There is no evidence to be presented.

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RELATED PROCEEDINGS APPENDIX

There are no related proceedings.

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